$O = A$
$* = B$

Obs	X_1	X_2	Label
1	1	4	A
2	1	3	A
3	0	4	B
4	5	1	B
5	6	2	A
6	4	0	B

1a. (15 points) Plot the observations in two dimensions (X_1 on the x axis and X_2 on the y axis). Label the points with their randomly-assigned cluster label.

1b. (20 points) The centroid of a cluster can be found using the following equation, where n is the number of observations in the cluster:

$$centroid(X_1, X_2) = (\frac{\sum X_1}{n}, \frac{\sum X_2}{n})$$

A: $\frac{1+1+6}{3}$, $\frac{4+3+2}{3} = 2.67, 3$

B: $\frac{0+5+4}{3}$, $\frac{4+1+0}{3} = 3, 1.67$

Using the equation, compute the centroid for each of the clusters, A and B. Plot the centroids on your figure from 1a. Note: You are not required to write a program to do this, but you're certainly welcome to!

1c. (15 points) Assign each observation to its closet centroid in terms of Euclidean distance. Label or otherwise indicate the new cluster labels for each observation.

Obs   New Label
1 - - - - - A
2 - - - - - A
3 - - - - - A
4 - - - - - B
5 - - - - - B
6 - - - - - B

Bonus question (20 bonus points THAT'S RIGHT additional points)

Use Dijkstra's algorithm to find the shortest path from node A to all other nodes in the network below. To receive the 20 points, your results must include: